Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Room-temperature magnetocurrent in antiferromagnetically coupled Fe/Si/Fe[1] RASHID GAREEV, MAXIMILIAN SCHMID, JOHANN VANCEA, CHRISTIAN BACK, University of Regensburg, REINERT SCHREIBER, DANIEL BUERGLER, CLAUS SCHNEIDER, Forschungszentrum Juelich, FRANK STROMBERG, HEIKO WENDE, University of Duisburg-Essen — Epitaxial Si-based ferromagnet/semiconductor structures demonstrate strong antiferromagnetic coupling (AFC) as well as resonant-type tunneling magnetoresistance, which vanishes at temperatures above T∼50K [1]. Magnetoresistance effects in Fe/Si/Fe close to room temperature (RT) were not established yet. By using the ballistic electron magnetomicroscopy (BEMM) techniques, with its nanometer-scaled locality [2] we observed for the first time a spin-dependent ballistic magnetotransport in AFC structures. We found that the hot-electron collector current with energies above the Fe/GaAsP Schottky barrier reflects magnetization alignment and changes from I_{cAP} ∼50fA for antiparallel alignment to I_{cP} ∼150fA for the parallel one. Thus, the magnetocurrent $[(I_{cP}\text{-}I_{cAP})/ I_{cAP}]$*100% is near 200 % at RT. The measured BEMM hysteresis loops match nicely with the magnetic MOKE data.
[1]. R.R. Gareev, M.Weides, R. Schreiber, U. Poppe, Appl. Phys. Letts **88**, 172105 (2006); [2]. E. Heindl, J. Vancea, C.H. Back, Phys. Rev.**B75**, 073307 (2007).

[1]This work is supported by the project DFG 9209379.

Rashid Gareev
University of Regensburg

Date submitted: 23 Dec 2010 Electronic form version 1.4